

CLAIMS

1. An image pick-up apparatus comprising:  
an opening provided in a shield that intercepts  
propagation of a wave;  
a two-dimensional image pick-up device; and  
an intermediate surface disposed between the opening  
and the two-dimensional image pick-up device,  
wherein the wave passes through the opening and forms  
an image of an object on the intermediate surface.
2. The image pick-up apparatus according to Claim 1,  
wherein the image has no spatial distortion.
3. The image pick-up apparatus according to Claim 1 or  
2, wherein the waves include electromagnetic waves having no  
mass, quantum waves corresponding to the wave nature of  
particles having mass, and sound waves corresponding to the  
motion of objects, and all other waves.
4. A method for forming and picking up an image by  
using a combination of an opening and a two-dimensional  
image pick-up device, the method comprising the steps of:  
providing an intermediate wave converter between an  
opening and a two-dimensional image pick-up device, the

intermediate wave converter being for transforming a wave into a wave (detectable wave) and wavelength that the two-dimensional image pick-up device can detect,

converting an image formed from a wave coming from the opening into a detectable wave with the intermediate wave converter; and

catching and picking up an image of the detectable wave with the two-dimensional image pick-up device.

5. A method for forming and picking up an image by using a combination of an opening and a two-dimensional image pick-up device, the method comprising the steps of:

providing an intermediate wave converter between an opening and a two-dimensional image pick-up device, the intermediate wave converter being for converting a wave;

converting an image formed from a wave coming from the opening into a detectable wave with the intermediate wave converter;

catching and picking up an image of the detectable wave with the two-dimensional image pick-up device;

calibrating the image picked up with the two-dimensional image pick-up device with a computer; and  
outputting.

6. The method for forming and picking up an image by

using a combination of an opening and a two-dimensional image pick-up device according to Claim 4 or 5, wherein the intermediate wave converter comprises a wave-converting surface having a calibration grid pattern, and distortion of the image on the wave-converting surface is calibrated using information of the calibration grid pattern.

7. The method for forming and picking up an image by using a combination of an opening and a two-dimensional image pick-up device according to Claim 6, wherein the number of squares of the calibration grid pattern corresponds to the spatial resolution required for applications.

8. The method for forming and picking up an image by using a combination of an opening and a two-dimensional image pick-up device according to Claim 4, 5, or 6, wherein the diameter of the opening is large, and the distance between the opening and the image-forming surface of the intermediate wave converter is long to achieve an optimum resolution.

9. The method for forming and picking up an image by using a combination of an opening and a two-dimensional image pick-up device according to Claim 4, 5, or 6, wherein

the diameter of the opening is small, and the distance between the opening and the image-forming surface of the intermediate wave converter is short to achieve an optimum resolution.

10. The method for forming and picking up an image by using a combination of an opening and a two-dimensional image pick-up device according to Claim 6, wherein wave-detecting elements are placed at grid points of the calibration grid pattern of the intermediate wave converter so that the intermediate wave converter itself serves as a two-dimensional image pick-up device.

11. A method for forming and picking up an image by using a combination of an opening and a two-dimensional image pick-up device, the method comprising the steps of:

providing an intermediate wave converter between a single opening or a plurality of openings and a two-dimensional image pick-up device, the intermediate wave converter being for converting a wave into a wave (detectable wave) and wavelength that the two-dimensional image pick-up device can detect;

converting an image formed from an electromagnetic wave, quantum wave, or sound wave coming from the opening into detectable wave light with the intermediate wave converter;

and

catching and picking up an image of the detectable wave light with the two-dimensional image pick-up device.

12. A method for forming and picking up an image by using a combination of an opening and a two-dimensional image pick-up device, the method comprising the steps of:

providing an intermediate wave converter between a single opening or a plurality of openings and a two-dimensional image pick-up device, the intermediate wave converter being for converting a wave;

converting an image formed from an electromagnetic wave, quantum wave, or sound wave coming from the opening into detectable wave light with the intermediate wave converter;

catching and picking up an image of the detectable wave light with the two-dimensional image pick-up device;

calibrating the image picked up with the two-dimensional image pick-up device with a computer; and

outputting.

13. The method for forming and picking up an image by using a combination of an opening and a two-dimensional image pick-up device according to Claim 4, 5, or 7, wherein an X-ray or a gamma ray is used as the electromagnetic wave coming from the opening, the diameter of the opening is

large, and the distance between the opening and the image-forming surface of the intermediate wave converter is long to achieve an optimum resolution.

14. The method for forming and picking up an image by using a combination of an opening and a two-dimensional image pick-up device according to Claim 4, 5, or 7, wherein an X-ray or a gamma ray is used as the electromagnetic wave coming from the opening, the diameter of the opening is small, and the distance between the opening and the image-forming surface of the intermediate wave converter is short to achieve an optimum resolution.

15. An apparatus for forming and picking up an image by using a combination of an opening and a two-dimensional image pick-up device, the apparatus comprising:

(a) a single opening or a plurality of openings;

(b) a cylinder for integrating the opening and the two-dimensional image pick-up device for visible light, the cylinder being long so that the distance between the opening and the image-forming surface of the intermediate wave converter is long;

(c) an intermediate wave converter for converting an electromagnetic wave coming from the opening into visible light; and

(d) a two-dimensional image pick-up device for picking up an image from the converted visible light.

16. An apparatus for forming and picking up an image by using a combination of an opening and a two-dimensional image pick-up device, the apparatus comprising:

(a) a single opening or a plurality of openings;

(b) a cylinder for integrating the opening and the two-dimensional image pick-up device for visible light, the cylinder being short so that the distance between the opening and the image-forming surface of the intermediate wave converter is short;

(c) an intermediate wave converter for converting an electromagnetic wave coming from the opening into visible light; and

(d) a two-dimensional image pick-up device for picking up an image from the converted visible light.

17. An apparatus for forming and picking up an image by using a combination of an opening and a two-dimensional image pick-up device, the apparatus comprising:

(a) a single opening or a plurality of openings;

(b) a cylinder in which the opening is formed;

(c) an intermediate wave converter for converting an electromagnetic wave coming from the opening into visible

light;

(d) a two-dimensional image pick-up device for picking up an image from the converted visible light; and

(e) means for calibrating the image picked up by the two-dimensional image pick-up device with a computer.

18. An apparatus for forming and picking up an image by using a combination of an opening and a two-dimensional image pick-up device according to Claim 17, wherein the intermediate wave converter comprises a wave-converting surface having a calibration grid pattern, and distortion of the image on the wave-converting surface is calibrated using information of the calibration grid pattern.

19. The apparatus for forming and picking up an image by using a combination of an opening and a two-dimensional image pick-up device according to Claim 17, wherein the diameter of the opening is large, and the cylinder is long so that the distance between the opening and the image-forming surface of the intermediate wave converter is long to achieve an optimum resolution.

20. The apparatus for forming and picking up an image by using a combination of an opening and a two-dimensional image pick-up device according to Claim 17, wherein an X-ray



or a gamma ray is used as the electromagnetic wave coming from the opening, the diameter of the opening is small, and the cylinder is short so that the distance between the opening and the image-forming surface of the intermediate wave converter is short to achieve an optimum resolution.

21. The apparatus for forming and picking up an image by using a combination of an opening and a two-dimensional image pick-up device according to Claim 17, wherein distortion caused by a spatial image-forming system and lens image-forming system is automatically corrected by the computer using the calibration grid pattern of the wave-converting surface, and a distortion-free signal is output from the two-dimensional image pick-up device.